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No. 2.

THE COLEOPTERA OF CANADA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

XIV. THE MEOIDÆ OF ONTARIO AND QUEBEC.

The Canadian species of Meloidæ are few in number, but offer considerable difficulty to the student, chiefly from the fact that some of them are extremely variable in colour and size, while in the genus *Meloe* we meet with a group in which the specific characters have never been accurately determined. The family is characterized by the vesicant or blistering properties of its members (the "Spanish fly" being perhaps the best known in this connection), and, under the name of cantharides, blister-beetles are to be found in every drug store. To the agriculturist they are often a pest, *Macrobasis unicolor* often doing considerable damage to potatoes. The naturalist finds in the curious modifications of the antennæ of the males, a theme worthy of his careful study.



FIG. 1.—Larva of Blistering Beetle.

The larval habits of but few species have been worked out, and these vary somewhat among themselves. The account of the transformations of some European species of *Meloe* has been so often copied in entomological text books that it seems scarcely necessary to reproduce it here. It may be enough to note that the larvæ are hatched as minute six-footed active creatures, which find their way on to the bodies of bees, and are carried in this way into the nests. Here they feed on the provisions and larvæ of the bees, changing their form several times before appearing as pupæ.

Technically, the family characters may be summed up as follows:—

Hind tarsi 4-jointed, the others 5-jointed; anterior coxal cavities open behind. Head strongly narrowed at base into a small neck, front vertical; lateral suture of prothorax entirely obliterated. The base of the prothorax narrower than that of the elytra, the hind coxæ are large and promi-

ment, and the claws are either cleft or toothed. The chief development of the group in North America is to be found in the regions lying to the westward of the Missouri River and southward of the Platte. Here the species of *Cantharis* and *Pyrota* abound, and, with representatives of several peculiar genera which are unknown in the Eastern districts, give to the fauna a facies which is unmistakable. Some of these Southwestern forms are of considerable size, *Macrobasis longicollis*, Lec., reaching the length of an inch, while *M. atrivittata* is even larger, and is, besides, of great beauty. *Cysteodemus Wislizeni*, Lec., is remarkable on account of its form—the elytra being convex and inflated, giving a conical appearance of obesity to the insect. In colour it is of a bright blue, and a more curious species in most respects does not exist in our fauna.

The genera reported from Canada may be readily separated by the following table:—

Elytra short, overlapping along the suture and leaving most of the abdomen exposed. Wings absent. *Meloe*.

Elytra long, almost or quite covering the abdomen, not overlapping at suture. Wings usually present.

Second joint of antennæ as long or longer than the third; first joint elongate in the male *Macrobasis*.

Second joint of antennæ shorter than the third, usually not more than half as long.

Antennæ not thickened towards the tip, setaceous, usually much longer than the head and thorax. Surface of body not metallic. *Epicauta*.

Antennæ scarcely longer than the head and thorax, much thickened towards the tip; the outer joints short and broad. Labrum deeply emarginate at middle. *Pomphopax*.

Antennæ extending beyond base of thorax, the joints bead-like in form; labrum slightly emarginate at middle. Surface of body metallic. *Cantharis*.

It will be understood that the above characters are not of necessity essential, and that they are intended to apply only to the Canadian forms constituting the genera. Several species of *Cantharis* from other regions are not metallic, and there is a great range of variation in the form of the antennæ. This matter is discussed more fully in Dr. Horn's papers, the titles of which may be found in the bibliography.

MELOE, Linn.

A most difficult genus to treat. The species are clumsy insects with short elytra, which do not cover the large, unwieldy abdomen. They may be found crawling about on low herbage during the cooler portions of the day, or sometimes on flowers; apparently they are most common in autumn and spring. When disturbed they emit a disagreeable fluid from the joints.

As one of the species is lacking in our collection, we have applied to Dr. Horn for the synopsis serving to separate the four Canadian forms among themselves.

Thorax evidently longer than wide, sparsely and irregularly punctate.

Elytra rather finely strigose and subopaque; general colour dull blue; head scarcely punctate. *americanus*, Leach.

Thorax not longer than wide.

General colour black, dull; thorax coarsely punctured and with an impression on basal half of median line. *impressus*, Kirby.

Blue-black, slightly shining; thorax moderately densely punctate, disk not impressed; elytra not roughly sculptured. *niger*, Kirby.

Decidedly blue and rather shining; thorax very coarsely, deeply, not densely punctured, disk not impressed; elytra rather coarsely sculptured. *angusticollis*, Say.

MACROBASIS, Lec.

Contains only one Canadian species, *M. unicolor*, Kirby. (Fig. 2.) The body is black, covered with whitish hairs which give an ashen appearance to the insect. The male differs from the female in having the second antennal joint longer than the third and fourth together. Length, .32-.64 in. Often occurs in such numbers on potato vines as to do considerable mischief.

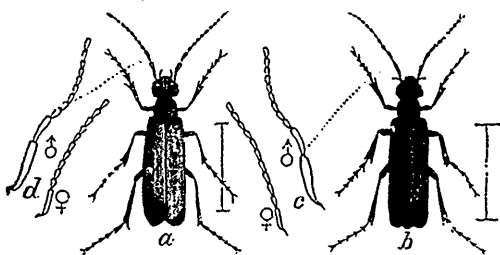


FIG. 2.

EPICAUTA, Redt.

Four species recorded from Canada are included here. They resemble only the preceding genus in form and may be readily separated from it by the antennal characters. In habits they also resemble *Macro-*

basis, being found commonly on flowers or herbage. We have taken *trichrus* on convolvulus, *pennsylvanica* on golden-rod, *ferruginea* on Helianthus, and *vittata* on various low plants along river banks.

Elytra yellowish with two black stripes. .50-.80 in. .*vittata*, Fab. (Fig. 3).
Elytra unicolorous, never striped.

Antennæ scarcely tapering to tip, joints nearly cylindrical.

Colour usually black; head in great part red; varies occasionally in being entirely covered with cinereous pubescence; thorax longer than wide, more densely punctured than the head. .30-.50 in. *trichrus*, Pall.

Colour ferruginous or cinereous, owing to the dense pubescence; thorax not longer than wide, not differently punctured from the head; antennæ short. .12-.36 in. .*ferruginea*, Say.

Antennæ tapering at tip, joints looser and more constricted or narrowed at base.

Black, coarsely pubescent; head and thorax similar in punctuation. .28-.50 in. *pennsylvanica*, DeG.

POMPHOPÆA, Lec.

P. Sayi, Lec., has been reported from the Sudbury district. It is a greenish insect, .60-.70 in. long, with short antennæ which enlarge towards the tip. The legs are reddish-yellow; the knees, tips of tibiæ and tarsi, dark.

CANTHARIS, Linn.

Two very fine metallic green or bronzed species belong here. They separate best by the use of secondary sexual characters, as made known by Dr. Horn, thus:—

Fifth abdominal segment of ♂ with a broad emargination, which is bisinuate at bottom; lateral lobes rather prominent. Female with hind trochanter subangulate. .64-1.10 in. *Nuttalli*, Say.

Fifth abdominal segment of ♂ with an acute notch at middle, the lateral lobes broadly rounded. Hind trochanters of ♀ not subangulate. .50-.70 in. *cyanipennis*, Lec.

In both of the above species the hind trochanters of the male are armed with a spine at middle, and by this character they may be separated from *C. viridana*, Lec., which occurs in the Northwest Territory. The males here have the hind trochanters unarmed.

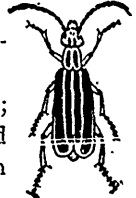


FIG. 3.

In the further study of the Meloidæ the student will find the following works of value :—

1853. Leconte, J. L. Synopsis of the Meloides of the United States. Proc. Acad. Nat. Sci., Phil., VI.
1866. Leconte, J. L. New Species of North American Coleoptera. Smithsonian Institution. *Pyrota*, p. 159; *Pomphopæa*, p. 160.
1873. Horn, Geo. H. Revision of the Species of Several Genera of Meloidæ of the United States. Proc. Am. Phil. Soc., XIII.
1875. Horn, Geo. H. Synonymical Notes and Descriptions of New Species of North American Coleoptera. *Zonitis*, p. 155. Tr. Am. Ento. Soc., V.
1878. Horn, Geo. H. Contributions to the Coleopterology of the United States, No. 2. *Calospasta*, p. 59. Tr. Am. Ento. Soc., VII.
1880. Leconte, J. L. Short Studies of North American Coleoptera. Trans. Am. Ento. Soc., VIII. *Nemognatha*, p. 212.
1885. Horn, Geo. H. Studies among the Meloidæ. Trans. Am. Ento. Soc., XII.

In addition to the above, a few notes on the smaller genera have been published, and certain portions of various larger ones gone over, but these titles have been omitted for lack of space.

THE NORTH AMERICAN SPECIES OF GNATHODUS.

BY CARL F. BAKER, FORT COLLINS, COLO.

The genus *Gnathodus*, as at present accepted, includes forms closely allied to *Cicadula*, but differing in having only two apical cells in the wing. They are of a weaker build than species of *Cicadula*, and a characteristic appearance from above makes them readily distinguishable from any of that genus. The species are very variable and difficult to define. They are small, more or less slender, greenish, yellowish, or whitish Jassids, usually without distinct markings. The ocelli are distant from the eyes. The clypeus usually somewhat exceeds the genæ. The ovipositor rarely exceeds the pygofer. In the United States at least, most of the species are of very wide distribution.

TABLE OF SPECIES.

- A. Head wider than pronotum; vertex not at all produced; colour very pale sordid greenish-fuscous, elytra whitish-subhyaline, sternum black; length, 3-3.25 mm. *abdominalis*.
- AA. Head narrower than pronotum, often much so.

- B. Sternum green or yellow.
- C. Size medium to small; length, 3-4.25 mm.; vertex not strongly produced.
- D. Elytra whitish-translucent; head and thorax pale olive-green; slender; length, 3.5-4 mm. *impictus*.
- DD. Elytra whitish-subhyaline, greenish to yellow on basal two-thirds; head and thorax yellow or yellowish-green; robust, length 3.75-4 mm. *impictus*, var. *flavus*, n. var.
- DDD. Elytra pale greenish-hyaline; head and thorax green; slender; length, 4.25 mm. *medius*, n. sp.
- CC. Size large; length, 5 mm.; vertex strongly produced; yellowish throughout, with hyaline elytra. *manitou*.
- BB. Sternum black.
- E. Face at least, and usually vertex, pronotum, and scutellum, with distinct fuscous markings.
- F. Elytra not distinctly maculated with black; vertex not produced. *confusus*.
- FF. Elytra more or less strongly marked with black; vertex distinctly produced. *punctatus*.
- EE. Face, vertex, pronotum, and scutellum, greenish, without distinct fuscous markings.
- G. Elytra whitish-translucent throughout; veins narrowly greenish; slender, length, 4.25 mm. *occidentalis*, n. sp.
- GG. Elytra pearly-white, green towards the base; veins broadly green; robust, length, 4.5 mm. *Livingstonii*, n. sp.

Gnathodus abdominalis, VanD.

1892. VanDuzee, CAN. ENT., XXIV., p. 113.

1894. VanDuzee, Trans. Am. Ent. Soc., XXI., p. 307.

1895. Gillette & Baker, Prelim., List Hemip., Colo., p. 104.

1895. Gillette, 7th Ann. Rep. Colo. Exp. Sta., p. 60.

Head wider than pronotum. Face a fourth wider than long. Front two-sevenths longer than wide, two and one-sixth times longer than the clypeus. Clypeus broader at base than at tip, sides subparallel or slightly incurved, tip broadly rounded. Vertex evenly rounded, not produced. Pronotum two and one-eighth times as wide as long, length two and a fourth times that of the vertex, hind margin nearly straight, curvature about half of the length. Ovipositor exceeding the pygofer. Hind margin of the last ventral segment in the female apparently slightly

bisinate. Plate in male evenly rounded; valves narrowly, strongly produced, exceeding the plate by twice its length; tips straight.

Colour pale yellowish-fuscous on the head and thorax, the latter sometimes with three faint longitudinal fuscous stripes. Front more or less washed with rufous. Elytra whitish-subhyaline; sternum black. Abdomen above black except margins of segments. Venter yellow. Length, 3 mm.

The above description was prepared from Colorado specimens determined as straight *abdominalis* by Mr. VanDuzee. The distribution of the species in Colorado, as far as determined, is given in Prelim. List Hemip. Colo. In this State it has been recorded from barley and sugar-beet. The species was originally described from New Jersey (Smith). I have before me, also, specimens from the collection of the Ill. State Lab. Nat. Hist., bearing data as follows: June 19, on wheat; July 27; Sept. 17, on wheat.

In the original description, Mr. VanDuzee says of the male genitalia: "Valve large, as long as the two apical ventral segments taken together; apex angled, subacute. Plates but little surpassing the valve, etc." However, in our specimens—determined by Mr. VanDuzee—they are as described above. In this genus, within certain limits, the genitalia are variable in form. Moreover, as among Typhlocybrids, many marked changes are produced in the genitalia by drying, so that most characters drawn from these parts require verification in fresh specimens.

In this species the ocelli are rather nearer to the eyes than is usual in the genus.

Gnathodus impictus, VanD.

1892. VanDuzee, CAN. ENT., XXIV., p. 113.

1894. VanDuzee, Trans. Am. Ent. Soc., XXI., p. 307.

Head narrower than the pronotum. Face one-sixth wider than long. Front two-sevenths longer than wide, twice the length of the clypeus. Clypeus as broad at tip as at base, sides subparallel, tip strongly, evenly rounded. Genæ broad below the loræ. Vertex distinctly produced. Pronotum little less than twice wider than long, length two and a-half times that of the vertex, hind margin distinctly incurved, curvature less than half the length. Ovipositor about equalling pygofer. Hind margin of last ventral segment of female truncate or slightly incurved. Plate in male strongly rounded; valves strongly produced; tips as long as discs, slender, incurved at apex; valves and pygofer with strong white spines.

Colour green, yellowish beneath and on scutel; anterior edge of pronotum and basal angle of scutel with faint indications of rufous. Abdomen above, except margins of segments, black. Elytra whitish translucent, costa at base sometimes greenish. Length, 3.5-4 mm.

The above description was made from a male and female collected at Lakeland, Md. (F. C. Pratt). These do not fit the original description exactly in the form of the male genitalia, but the difference is not specific and the specimens are otherwise typical. I also have specimens before me from Salineville, Ohio (Cornell Univ. Coll.); Washington, D. C. (Heidemann); Ag. Coll. Miss. (H. E. Weed). Specimens from the collection of the Ill. State Lab. Nat. Hist. bear the following data:—April 23, on rye; May 7, on strawberry; May 9, on blue-grass; June 22, on wheat. The species was originally described from New Brunswick, N. J. (Smith).

Gnats. dus impictus, var. *flavus*, n. var.

Slightly larger and more robust than typical *impictus*. Colour yellow or greenish-yellow throughout, including the subhayline elytra towards the base. Also varying from typical *impictus* in the form of the vertex, face, and male genitalia.

Described from three large series of specimens. The first from Ithaca, N. Y., (Cornell Univ. Coll.). The second from the collection of Mr. Chas. Hart (Illinois:—Acc. Nos. 500-512-514-522-525-526-530-535). The third from the collection of the Ill. State Lab. Nat. Hist., bearing data as follows:—May 15; June 17, on weeds; June 26, on clover; July 2 to 25.

This is one of the most puzzling lot of Jassids that has ever come to my notice. The variation in colour, form, and structure seems extreme; and yet is gradual throughout the whole series. The vertex varies from scarcely at all produced to distinctly produced. The valves in the male vary from not at all produced to the typical form, though the character of the tips is the same in every case. The specimens from Illinois are mostly entirely yellow, though greenish forms occur. On the other hand, those from New York are mostly distinctly greenish-yellow, the yellow forms being rare.

Gnathodus medius, n. sp.

Female; Head narrower than the pronotum. Face about a twelfth wider than long. Front two-fifths longer than wide, length little more than twice that of the clypeus. Clypeus with sides straight, gradually

evenly broadening to a truncate tip, exceeding the genæ more than usual. Genæ of medium width below the loræ. Vertex slightly produced at middle. Pronotum four-fifths wider than long, length four times that of the vertex, curvature little less than half the length, hind margins slightly concave. Last ventral segment truncate, lateral angles curved downward. Ovipositor about equalling pygofer, the latter with scattering short white spines on the apical two-thirds.

Colour yellowish-green. Front with faint indications of one or two transverse arcs. Basal angles of scutellum somewhat darker. Elytra hyaline, with nervures, and costal and inner margins at base, greenish. Sternum greenish. Abdomen above, except margins of segments, black. Length, 4.25 mm.

Pullman, Washington (C. V. Piper). This form is near *impictus*, but is longer and more slender. It also differs in other respects as described above. Larger series from intermediate points, may show it to be but a variety of *impictus*.

Gnathodus manitou, G. & B.

1895. Gillette & Baker, Prelim. List Hemip. Colo., p. 105. Fig.

"Face finely shagreened, a seventh wider than long; clypeus nearly twice as long as broad, rounded at the tip, slightly constricted before the base, basal suture strongly curved; loræ nearly as long and three-fourths as broad as the clypeus; genæ moderately broad, rather deeply depressed beneath the eyes, outer margin angularly incised below the eyes, sharply rounded below, attaining the tip of the clypeus; front one-half longer than broad, twice as long as the clypeus, gradually narrowing below, obtusely rounded above. Vertex one-half longer on the middle than next the eyes, width between the eyes two and one-half times the length at the middle. Pronotum five-sixths broader than long, two and three-fifths times longer than the vertex, curvature two-fifths of the length, posterior margin very slightly concave, anteriorly smooth, posteriorly with scattered feeble punctures, on the posterior median portion finely obliquely rugose, the lines converging backwards. Last ventral segment feebly rounded behind, nearly truncate, pygofer with numerous stout hairs along the whole length. Colour pale green, unicolorous. Elytra hyaline.

"Length, 5 mm. Described from one female.

"Manitou, July (Tucker)."

As this species is only known from the unique type, I quote the original description. The colour should have been stated as yellowish-green instead of pale green

Gnathodus confusus, G. & B.

1895. Gillette & Baker, Prelim. List Hemip. Colo., p. 104. Fig.

"Face one-fifth wider than long; clypeus twice as long as broad basal suture strongly curved, somewhat constricted near the base broadest near the tip; loræ about three-fourths as broad and three-fourths as long as the clypeus; genæ broadly depressed beneath the eye-margin beneath the eyes inverted, broadly rounded below, moderately broad below the loræ and attaining the tip of the clypeus; front one-fifth longer than broad, once and two-thirds the length of the clypeus, superiorly broadly rounded. Face, vertex, and pronotum finely shagreened. Vertex scarcely longer on the middle than next the eyes, width between the eyes slightly more than four times the length at the middle. Pronotum slightly less than twice as broad as long, length nearly four times that of the vertex, curvature about one-half of length, considerably wider than the head, hind margin slightly concave. Transverse groove of scutellum black. Hind margin of last ventral segment of female truncate. Colour yellowish-green. Face sordid yellow, basal angles of the clypeus with an infuscated spot. Vertex of the same colour as the face, with three indistinct longitudinal smoky bands, the ocelli in light areas. Pronotum light yellowish-green on the anterior and lateral margins, darker green on the middle, two dark brown spots medially just back of the anterior margin, the latter in some specimens entirely obsolete. Scutellum pale yellow, basal angles darker. Elytra greenish-subhyaline, slightly maculate with brown near the clavus, somewhat smoky towards the tip. Tergum black with the apical margins of the segments yellow. Venter yellow with the first two or three segments black at the base, pygofers yellowish. Sternum black. Legs yellowish throughout with infuscated lines on the outside of the femora.

"Length, 3.75 mm. Described from seven females.

"Pleasant Valley, seven miles north-west of Fort Collins, June 12th, Estes Park, July 12th (Gillette); Steamboat Springs, July 12th, Carex (Baker).

"We have a single female specimen which seems distinct from the species, but to which at this time we hesitate giving a name. It differs as follows: The colour more yellowish. Pronotum distinctly less than twice broader than long. Length, 4 mm.

"Estes Park, July 12th (Gillette)."

I quote the original description. Larger series of this species show some variation from the types. With the exception of two specimens from the collection of the Ill. State Lab. Nat. Hist. (Acc. 1880-4620), I have seen no specimens taken outside of Colorado. This form may eventually prove to be a variety of *punctatus*. In *confusus* the vertex is evenly rounded, not produced, while in *punctatus* it is distinctly produced. *Confusus* also lacks the conspicuous maculation of the elytra. In some specimens the markings vary to a bright fulvous.

Gnathodus punctatus (Thunb.) Fieb.*

1782. Thunberg, Act. Ups., VI., p. 21 (*Cicada punctata*).

1866. Fieber, Verh. d. zool.-bot. Gesell, Wien, XVI., p. 505.

(*Gnathodus punctatus*).

1872. Provancher, Nat. Can., IV., p. 378 (*Typhlocyba rosca*).

1890. Provancher, Pet. Faune Ent. Can., III., p. 300-301 (*Typhlocyba punctata* and *T. jocosca*).

1894. VanDuzee, Trans. Amer. Ent. Soc., XXI., p. 307.

Distinguished by the more or less strongly maculated elytra and produced vertex. Otherwise very closely resembling *confusus*. A careful comparison between series of the American forms referred to this species, and authentic specimens of the European *punctatus*, would be very desirable.

This species is probably widely distributed in the U. S. I have collected it at Ag. Coll., Michigan, and at Fort Collins, Colo., and also have specimens from Ithaca, N. Y. (Cornell Univ. Coll.). There is considerable variation in colour, some specimens having strong pink or roseate suffusion, others being quite strongly green.

Gnathodus occidentalis, n. sp.

Head narrower than pronotum. Face an eighth wider than long. Front about a half longer than wide, and twice the length of the clypeus. Clypeus gradually broadening to the very slightly rounded tip. Genae broad below lore. Vertex very slightly produced at the middle. Pronotum about seven-eighths wider than long, three and two-thirds the length of the vertex, curvature seven-fifteenths of the length. Last ventral segment of female truncate at tip. Ovipositor equalling pygofer,

*The synonymy of this species is essentially the same as that given by Mr. VanDuzee in his "List of N. A. Jassoidea." The extended European bibliography I do not attempt to give.

the latter with very short, weak, white spines. Valves of male with long, white spines on edges of discs, tips produced into finger-like processes as long as discs.

Colour pale green. Face with faint indications of about three brownish arcs. Basal angles of scutellum yellowish. Elytra milky white with the veins and costal margin greenish. Sternum black. Abdomen above, and beneath at base, except margins of segments, black. Length 4.25 mm.

Pullman, Washington (C. V. Piper). This form may prove to be a variety of *medius* on the examination of large series, but it differs in having a black sternum and milky elytra.

Gnathodus Livingstonii, n. sp.

Female: Head narrower than the pronotum. Face a twelfth wider than long. Front a fourth longer than wide, somewhat less than twice the length of the clypeus. Clypeus gradually broadening to the truncate tip. Genæ narrow below the loræ. Vertex very slightly and broadly produced, with a small but distinct pit on either side at base, midway between the median line and eye. Pronotum two-thirds wider than long about four times the length of the vertex; curvature seven-sixteenths of the length, hind margin straight. Hind margin of last ventral segment truncate. Ovipositor about equalling pygofers, the latter with rather long, whitish spines on the apical two-thirds.

Colour bright, rather deep, green. Scutellum yellowish at basal angles. Elytra pearly-white, greenish towards the base, nervures broadly green. Sternum, abdomen above and at base beneath except margins of segments, black. Robust. Length, 4.5 mm.

Corfield, Vancouver Island, B. C. (Mr. Clermont Livingston). This is one of many most interesting things which Mr. Livingston's industry has turned up in Vancouver Island, and I take pleasure in dedicating it to him. It is near *occidentalis*, but is longer, more robust and differs in coloration.

PROSOPIS SUBTILIS.

Prosopis mesilla, n. n.

Syn. *F. subtilis*, Fox in litt., Ckll., Tr. Am. Ent. Soc., 1895, p. 29; (Not *P. subtilis*, Forst.)

T. D. A. COCKERELL.

NEW CULICIDÆ FROM NORTH AMERICA.

BY D. W. COQUILLET, WASHINGTON, D. C.

In the course of identifying the Culicidæ in the National Museum collection and those received by Mr. L. O. Howard from various correspondents, for mention in a paper which he is about to publish, entitled, "Notes on the Life history of *Culex pungens*, with remarks about other Mosquitoes," three forms were met with which clearly represent new species; and as Mr. Howard desires to exclude all matter of a purely technical nature from his paper, it was deemed advisable to publish the new species in one of our scientific periodicals. Accordingly, the descriptions are offered herewith:—

Culex signifer, n. sp.—♀. Head velvet black, its tomentum silvery-white, the pile black; antennæ, proboscis and palpi black, their tomentum mixed brown and silvery-white, that on apices of palpi wholly silvery. Thorax velvety brownish-black, marked on the anterior half with two silvery-white subdorsal vittæ, and with a silvery-white arcuate lateral line extending the entire length of the thorax; pleura marked with several spots of silvery-white tomentum; scutellum with two spots of similar tomentum on the upper side and one at the tip. Abdomen black, its tomentum violaceous, that at base of each segment white. Legs brown, femora largely yellowish, the tomentum mixed brown and silvery-white, that at apices of tibiæ pure white, each end of tarsal joints white, most extended on the hind tarsi; tarsal claws destitute of teeth on the under side. Wings hyaline, veins yellowish, the scales mixed brown and white; length, 4.8 mm.

District of Columbia. A single specimen, captured by the writer in June.

Near *fasciatus*, Fabr., but the lateral silvery line on the thorax is not strongly bent inward at the middle, and the tarsal claws are not toothed.

Culex tarsalis, n. sp.—♂. Head black, its pile and tomentum mixed brown and white; antennæ brown, apices of joints one to eleven broadly white, the hairs gray; proboscis nearly twice as long as the head and thorax united, naked, black, marked near the middle with a broad white ring; palpi slender, tapering to the tip, brown, the base of each joint white, sides of last two joints and outer side of the preceding one rather long gray pilose. Thorax black, marked with a dorsal gray vitta, tomentum of thorax yellowish, except a white subdorsal undulating line each side, a spot in front of the scutellum, above the root of each wing, and on

the pleura. Abdomen black, a fascia of white tomentum at base of each segment and at apices of the last three. Legs brown, in front and behind covered with white tomentum, bases of femora yellow, both ends of tarsal joints broadly white; front and middle tarsal claws each bearing a tooth on the under side, hind tarsal claws simple. Wings hyaline; scales of veins brown, with a few white ones intermixed.

♀ same as the ♂, with these exceptions: Palpi black, the apex broadly and inner side of apex of the penultimate joint covered with white tomentum; antennæ wholly brown; tarsal claws destitute of teeth. Thorax sometimes yellowish-brown. Length, 4.5 mm.

Argus Mts. and Folsom, Calif. One male and four females in the National Museum, collected by Mr. A. Koebele.

Closely related to *teniorhynchus*, Wied., but in that species the male has a tooth on under side of one tarsal claw and two beneath the other claw, and the female has each front tarsal claw toothed.

Megarhinus rutila, n. sp.—♂. Head black, tomentum of occiput blue in the centre, white next the eyes; antennæ brown, the first joint covered with blue tomentum on the outer side, that on the inner side silvery-white; hairs of antennæ dark gray, their bases brown; proboscis and palpi black, covered with an appressed blue, golden and violet tomentum. Thorax brown, its tomentum golden-brown and violet, that on the lateral margins pale golden; humeral angle and two large spots on the pleura covered with golden tomentum, scutellum covered with blue black and violet tomentum. Abdomen black, its tomentum blue, becoming violet at the tip, that on the lateral margins golden, on the ventral blue, mixed with a few golden ones; sides of abdomen bearing a few short pale yellow hairs. Legs black, the tomentum mixed blue, violet and golden, that on the coxæ and apices of femora entirely golden. Second joint and base of the third of each front and middle tarsi, fourth joint and base of the fifth of the hind tarsi, white; one claw of each front and middle tarsi toothed, the other claws simple. Wings hyaline, costal margin and the veins brown, the scales blue and violet.

♀ same as the ♂, with these exceptions: First joint of antennæ destitute of blue and silvery tomentum; second, third and base of fourth joint of the front and middle tarsi, white; tarsal claws simple. Length, 7 to 10 mm.

North Carolina and Georgiana, Florida. Three males and two females in the National Museum.

Readily recognized by the colouring of the tarsi.

IN REPLY TO CRITICISM.

BY HARRISON G. DYAR, PH. D., NEW YORK.

Mr. J. W. Tutt's article (Trans. Ent. Soc., Lond., 1895, pp. 343-362), reviewed by Mr. Grote (CAN. ENT., XXVII., p. 326), in which he correlates the recent attempts at a classification of the Lepidoptera, is both instructive and stimulating. Mr. Tutt is to be thanked for his useful and impartial criticism. As far as my own work on the larvæ is concerned, the following points are brought out:—

(1) The position of the Pyromorphidæ, Megalopygidæ and Eucleidæ was not found entirely from larval characters, and I am criticised for this. I accept the criticism; but at the time I had no material to prove their position entirely on larval characters. At present I have. Dr. Chapman, with his usual generosity, sent me several species of Anthroceridæ in stage I. (*Anthroceræ loniceræ*, *Adscita statices*, *A. geryon* and *A. globulariæ*), and all show the position of the stage to be such as I assumed for the position I assigned the families to. The Anthroceridæ have a primitive first stage: tubercles i. and ii. approximate, iii. normal, iv. and v. approximate, vi. (and the other thoracic subprimaries) absent, vii. on the leg base. The Pyromorphidæ have not been examined, but must go with the Anthroceridæ (Mr. Tutt's Zygaenidæ). The Megalopygidæ and Eucleidæ (=Limacodidæ) have no primitive first stage; but I have gotten at the arrangement of their tubercles in another manner. I have shown that the group of smooth Eucleid larvæ have their spinose warts greatly reduced by degeneration. This has proceeded so far that the setæ have reverted to the primitive condition. Not in the first stage, however, for here another peculiar process of extreme reduction has set in, whereby setæ i. and ii. have coalesced at base, forming a Y-shaped process, and in other species one arm of the Y has shortened, leaving apparently a single knobbed seta. But, after stage I. and before the larva is old enough so that the setæ are too small to be well examined, the characteristic high Micro. type of setæ is very evident, in our *Apoda y-inversa* and presumably also in the closely allied European *A. avellana* (*Limacodes testudo*). The details of the thoracic setæ confirm these conclusions nicely. The Megalopygidæ I assume to go with the Eucleidæ. I have no direct proof for them, as the primitive first stage is wanting, and I have yet to see any degenerate forms.

(2) My failure to divide the Tineina, due to lack of material, is noticed. I have been able partially to remedy this lack (see Journ. N.

Y. Ent. Soc., III., pp. 18-21), but I do not find that the larvæ present any remarkable diversity of structure. Some are exceedingly generalized, so much so as to suggest that they represent the stem form which gave rise to the Noctuidæ (Agrotidæ, Grote) as well as to the higher Microgasteridæ (Tineidæ), and I am inclined to confirm Mr. Hampson's remark, quoted by Mr. Tutt (p. 360): "As far as I am able to judge, the Tineidæ represent the ramifications of one branch of the Lepidoptera, some families generalized, others highly specialized, and not a heterogeneous collection of families sprung from various parts of the Lepidopterous tree as the old family Bombycidæ did."

(3) My position for the Pyralidæ among the true Micros. is shown to be at variance with the conclusions of Chapman and Hampson. This is a real difference, and is only confirmed by further material. In fact, the difference extends, as regards Dr. Chapman's classification, to all the Pyraloid objects, which I have had before me. This is easily reconciled if we may suppose that the objected pupal character has been developed independently, but in a parallel manner in more than one line of descent. In fact, I think in at least three, for I believe the Sphingidæ and Bombycidæ (Saturniids) are derived from a stem ancestral to that of the Tineidæ and Agrotidæ, whether the former two superfamilies be closely related or not. At any rate, I am content to let this contradiction stand for the present.

Finally, I would correct a passage in Mr. Tutt's paper where I am unintentionally misquoted (p. 347), apparently from a misunderstanding. I did not intend to imply that the most primitive form of tubercle is found "exclusively in the Jugatæ and Psychidæ," as Mr. Tutt's quotation reads. The original sentence is: "It is found in the less specialized families of all the groups . . . and exclusively in the Jugatæ and in the Psychidæ." As a matter of fact, I separated the Psychidæ thus from a consideration of the supposed homology of tubercles i. and ii. (see Synopsis, Ann. N. Y. Acad. Sci., VIII., p. 203), not from the generalized condition of the setæ, which clearly could not be done, as the original sentence shows. I find now that this separation was due to a misapprehension, and the Psychidæ really fall in with the other Tineidæ. (Compare *Hyponomeuta cognatella* for a similar reversal of tubercles i. and ii., by which I was deceived. However, Mr. Tutt's misinterpretation of the passage does not affect his conclusions essentially.

THE AMERICAN SPECIES OF ISOTOMA.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The genus *Isotoma*, as far as known, is confined to the Northern Hemisphere and to the more northern part of this region. Thirty-one species are recorded from Europe and Asia, while the same number is recorded in the present paper, from the Eastern United States.

The characters for differentiating the species of *Isotoma* are all drawn from the form of the claws and the apical segment of the spring. In the following descriptions, the larger claw is referred to as the superior and the smaller as the inferior claw. Several species have the superior claw trilobed when viewed from above; the lateral lobes appear as a large tooth along the outer margin of the claw when viewed from the side. The tarsi consist of a single segment. The apices of the tibiae in many species bear long, club-shaped hairs, which are known as tenant hairs. The spring is known technically as the furcula, its basal segment as the manubrium, the middle segment as the dentes, and the apical segment as the mucro. In the following descriptions, the furcula is considered as if extended caudad, the toothed edge being dorsad. The horizontal teeth of the mucro are those having their axis parallel to the axis of the mucro, and the vertical teeth those in which their axis is perpendicular to the axis of the mucro. The teeth are numbered from the apex cephalad. No measurements are given, as they have been looked upon as worthless; the formulæ of the claws and mucro are all that are necessary to recognize the species, young or adults.

I am under obligations to Mr. Samuel Henshaw, Museum Comparative Zoology, Cambridge, Massachusetts, for an opportunity to study the types of Dr. Packard, including all his species except *Besselsii* and *Walkerii*; to Mr. L. O. Howard, Department of Agriculture, Washington, D. C., for type specimens of *Besselsii* and of *palustris*, Muller, from Sweden, determined by Dr. Tycho Tullberg; to Mr. Nathan Banks, Sea Cliff, N. Y., and many others, who have been given due credit for the presentation of specimens.

1. Superior claw without teeth on the inner margin 2.
Superior claw with teeth on the inner margin : 18.
2. Mucro with the first tooth at the base of the second 3.
Mucro with the first tooth not at the base of the second 8.
3. Inferior claw with a tooth on the inner margin; superior claw without teeth on the outer or inner margins; tibiae without tenant hairs;

- mucro with four teeth, the first at the base of the second, the second and third subequal, the fourth smaller, arising at the side; dentes longer than the manubrium; ocelli sixteen, eight on each side of the head 4.
- Inferior claw without a tooth on the inner margin, inner margin strongly, roundly, dilated; superior claw without teeth on the outer or inner margins; tibiæ with a single tenant hair; mucro with three teeth, the first at the base of the second, the second and third subequal in length, vertical; dentes twice the length of the manubrium; body brownish, in some specimens with a slight indication of a median dorsal line; legs and furcula yellowish; eye spots black; antennæ twice the length of the head, the apices of the segments purplish, at base greenish. The typical specimens are from Salem, Massachusetts, and Waco, Texas. The Massachusetts specimens belong to *Isotoma viridis*, Bourlet, an European species, while the specimens from Texas are distinct, and Dr. Packard's name is retained for this form *tricolor*, Pack.
4. Dorsum with a distinct median black line 5.
Dorsum without a median black line 6
5. Yellowish, median and lateral black lines distinctly marked, median black line without lateral dilations in the third and fourth abdominal segments. Habitat—Europe, Asia, Africa, and North America **palustris*, Muller
- Yellowish, median black line with distinct lateral line-like dilations in the third and fourth abdominal segments; sides of the thoracic and abdominal segments clouded, darker near the margin. Habitat—Europe **palustris aquatilis*, Muller
6. Segments yellowish, with a wide transverse black band, covering the anterior two-thirds of each segment. Habitat—Borealia, Europe **palustris balteata*, Reuter
- Segments entirely of one colour 7
7. Entirely dilute greenish, immaculate. Habitat—Borealia, Europe **palustris prasina*, Reuter
- Entirely reddish-violaceous; antennæ and feet blue-black. Habitat—Borealia, Europe **palustris fucicola*, Reuter

8. Mucro with the first tooth horizontal, without any tendency towards forming a vertical or subvertical hook 9.
 Mucro with the first tooth vertical or subvertical, at least somewhat hooked. 11.
9. Mucro with two teeth 10.
 Mucro with three teeth—the first very short, horizontal, appearing somewhat as when the first tooth is at the base of the second ; the second and third, long, vertical, subequal. There is a round knot-like prominence at the base of the mucro, but it is not tooth-like ; superior claw without teeth on the outer and inner margins ; inferior claw scarcely dilated on the inner margin, with a tooth at middle ; dentes twice the length of the manubrium ; the furcula reaching the ventral tube ; body, legs and furcula, yellowish ; eye spot black ; antennæ a little longer than the head, purplish at apex. Habitat—Salem, Ohio *aequalis*, n. sp.
10. Manubrium longer than the dentes ; furcula not reaching the ventral tube ; superior claw without teeth on the outer and inner margins ; inferior claw with the inner margin not at all dilated, and without teeth ; tibiæ with two tenant hairs ; body mottled grayish, paler at the apices of the segments ; antennæ and legs white ; antennæ but little longer than the head ; body long and slender. Habitat—Fort Collins, Colorado (Carl F. Baker) *elongata*, n. sp.
 Manubrium shorter than the dentes, not extending beyond the apex of the abdomen ; furcula not reaching the ventral tube ; superior and inferior claws without teeth ; inner margin of the inferior claw greatly and roundly dilated ; mucro with two teeth—the first horizontal and pointedly rounded, the second vertical, of the same length as the first, pointed at apex ; body, legs, antennæ, and furcula, white ; antennæ not longer than the head. Collected on water drawn from a well. Habitat—Baton Rouge, Louisiana (H. A. Morgan). *manubriata*, n. sp.
11. Mucro with two teeth 12.
 Mucro with three or more 13.
12. Teeth of mucro indistinct ; mucro shaped like a portion of the rim of a wagon wheel, the cut end transversely emarginate, the dorsal and ventral corners forming the teeth ; the superior and

inferior claws without teeth; the inferior claw dilated on the inner margin; antennæ not twice as long as the head. Habitat—Nova Zembla, Northern Siberia, and Greenland **bidenticulata*, Tullb.

Teeth of mucro distinct, prominent, two first slightly longer than the second, both pointing caudad; superior and inferior claws without teeth; inferior claw of inner margin roundly dilated at middle; furcula reaching the ventral tube; dentes twice as long as the manubrium; body and antennæ blackish; legs and furcula white; antennæ a little longer than the head, the second and third segments dilated at apex. Habitat—Salineville, Ohio *parva*, n. sp.

13. Mucro with three teeth 14.

Mucro with four teeth—the first short, hooked; the second, long, vertical, and about as long as the mucro is wide; the third and fourth subequal to the second, vertical and opposite; superior claw without teeth; the inferior claw without teeth, but with the inner margin broadly, roundly, dilated; furcula not attaining the ventral tube; the dentes and manubrium subequal in length; body and antennæ yellowish, mottled with gray; legs and furcula white; antennæ not longer than the head. Habitat—Dover, Massachusetts (A. P. Morse) . . . *unica*, n. sp.

14. Superior claw with a tooth on the outer margin, inner margin without teeth; inferior claw without teeth, and the inner margin broadly, roundly, dilated; mucro with three teeth, the first and second of the same length, pointing in the same direction, and in the same line, the third shorter, vertical; furcula attaining the ventral tube; dentes twice the length of the manubrium; body and antennæ brownish-black; legs and furcula white; antennæ a little longer than the head. Habitat—Salem, Ohio *communa*, n. sp.

Superior claw without a tooth on the outer margin 15

15. Second tooth of mucro shorter than either the first or third, the third as long or longer than the first, all pointing dorso-caudad; superior and inferior claws without teeth; inferior claw somewhat dilated on the inner margin towards the base; furcula reaching the ventral tube; dentes twice the length of the

* Species not seen.

manubrium; body and antennæ dilute purplish; legs and furcula white; antennæ a little longer than the head. This species is paralleled in the European fauna by *Isotoma sensibilis*, Tullb. Habitat—Salineville, Ohio. *trispinata*, n. sp.

Second tooth of mucro as long as either the first or third. 16.

16. Inferior claw without a tooth on the inner margin. 17.

Inferior claw with a tooth on the inner margin, strongly dilated at middle; superior claw without teeth on the outer or inner margins, the outer margin roundly interrupted at middle; mucro with three teeth, the first long, terminal, evenly curved, and of the same length as the second, the second and third of the same length, opposite, as long as the mucro is wide, and pointing in the same direction as the first; furcula long, reaching to near the ventral tube; dentes very slightly longer than the manubrium; body yellowish; furcula and legs white; antennæ yellowish, apices of the segments purplish; apical segment semi-circular. Habitat—Fredericksburg, Virginia (William D. Richardson. *tridentata*, n. sp.

17. Furcula reaching the ventral tube; the dentes twice as long as the manubrium; superior and inferior claws without teeth; inferior claw with its inner margin roundly dilated towards the base; mucro with three teeth, the first tooth distant from the second, making a prominent curve, and pointing dorso-caudad, the second and third vertical, subequal in length, if any difference the third the shortest; body, legs, antennæ, and furcula, white; antennæ slightly longer than the head; eye spots black. It is impossible to distinguish living specimens of this species from the smaller species of *Lipura*, except when they jump. Habitat—Maine, Massachusetts, and New York. *albella*, Pack.

Furcula not reaching the ventral tube; the manubrium distinctly longer than the dentes; superior and inferior claws without teeth; the superior claw wide at base, a short distance from which it is suddenly and greatly constricted; the inferior claw with the inner margin dilated at base, rounded out at apex; mucro with three teeth, the first long, subvertical, distinctly hooked, the second and third of the same length, on opposite sides, and almost opposite; body, legs, antennæ, and furcula, blackish; head elongate; antennæ about as long as the head,

- the first and second segments dilated, as broad as long, and twice as broad as the third or fourth. Habitat.—Polaris Bay..... *Besselsii*, Pack
18. Superior claw with one tooth on the inner margin..... 19
 Superior claw with two teeth on the inner margin..... 33
19. Superior claw with a tooth on the outer margin..... 28
 Superior claw without a tooth on the outer margin..... 20
20. Inferior claw with a tooth on the inner margin..... 26
 Inferior claw without a tooth on the inner margin..... 21
21. Mucro emarginate at apex, the dorsal angle immediately dorsad of the ventral angle, with two teeth, the dorsal angle being the first the second of the same length, but more pointed; furcula reaching the ventral tube; dentes twice the length of the manubrium superior claw with a single tooth on the inner margin and none on the outer margin; inferior claw without teeth, dilated at base, the dilation interrupted before the middle, making a right angle; antennæ and body bluish-black; legs brownish; furcula white; antennæ one-third longer than the head. Habitat—Salineville, Ohio..... *brunnea*, n. sp
- Mucro not emarginate at apex..... 22
22. Mucro with two or three teeth..... 23
 Mucro with four teeth, the first minute, a mere hook, the second and third of the same length, vertical, as long as the mucro is wide, the fourth slightly shorter than the third and laterad of it, its base in a more dorsal plane, and pointing caudad; furcula attaining the ventral tube; dentes more than twice the length of the manubrium; superior claw with a single tooth on the inner margin and none on the outer margin; the inferior claw without teeth, the inner margin slightly dilated; body and antennæ mottled black; legs and furcula white; antennæ longer than the head. Habitat—Salineville, Ohio..... *synonymica*, n. sp
23. First tooth of mucro horizontal or subhorizontal..... 24
 First tooth of mucro forming a distinct hook..... 25
24. Mucro with three teeth, the first subhorizontal, broad, the second and third longer than the first, of equal length, one behind the other, pointing cephalad; furcula not reaching the ventral tube; the dentes twice the length of the manubrium; superior claw without teeth on the outer margin and with a single tooth on the

inner margin; inferior claw without teeth, the inner margin broadly, roundly, dilated; tibiæ with two tenant hairs; body dilute black; antennæ, legs, and furcula, dirty white; manubrium scarcely extending beyond the apex of the abdomen; body long and slender; antennæ not longer than the head. Habitat—Dover, Massachusetts (A. P. Morse), and Ithaca, New York *dilatata*, n. sp.

Mucro with two teeth, the first horizontal, the second vertical, of the same length as the first; furcula not reaching the ventral tube; dentes slightly longer than the manubrium; superior claw without a tooth on the outer margin, and with a single tooth on the inner margin; inferior claw without teeth, and not dilated on the inner margin; body, legs, antennæ, and furcula, white; manubrium not extending beyond the apex of the abdomen; antennæ of the same length as the head. Habitat—Maine and Massachusetts *nivalis*, Pack.

25. Dentes and manubrium subequal in length; furcula not attaining the ventral tube; superior claw without teeth on the outer margin, and with a single tooth on the inner margin; inferior claw without teeth, the inner margin not dilated; mucro with three teeth, all in the same line, the first terminal, minute, vertical, and forming a distinct hook; the second and third as long as the mucro is wide, and pointing cephalad; body, antennæ, and legs blackish-purple; furcula white; antennæ short, hardly as long as the head, the fourth segment longer than the three basal segments combined. Habitat—Salineville, Ohio *brevipenna*, n. sp.

Dentes more than twice as long as the manubrium; furcula attaining the ventral tube; mucro with three teeth, the first long, distinctly hooked, not extending dorsad beyond the middle of the second tooth; the second long, pointed, broad at base, about as long as the mucro is wide, and pointing dorsad; the third cephalad of the second, about half as large, and extending dorso-ventrad; superior claw without teeth on the outer margin, and with a single tooth on the inner margin; inferior claw without teeth, the inner margin greatly dilated; body, legs, antennæ, and furcula, snuff-yellow; antennæ about twice as long as the head. In determining this species great care will need to be taken, or

the tooth on the inner margin of the superior claw will be overlooked; it is very faint, scarcely perceptible in some cases. The type specimens of *Isotoma Walkerii* appear to be lost. There is nothing in the description of *Walkerii* to hinder its being united with *Isotoma leonina*. The only definite characters given in the description of *Walkerii* are a comparison of lengths of the segments of the antennæ. Specimens that undoubtedly *leonina*, and compared with the types of this species, do not differ from the description of *Walkerii*. A very common species under the bark of recently felled trees.

Habitat—Massachusetts (Packard); Ithaca, New York *Walkerii*, Pa

26. Tibiæ without tenant hairs; superior claw without teeth on the outer margin, and a single tooth on the inner margin; inferior claw with a tooth on the inner margin; mucro with three teeth—first forming a blunt, subhorizontal, obliquely rounded end; second and third of the same length, about as long as the mucro is wide; the third tooth in a higher plane than the second; furcula not attaining the ventral tube; dentes longer than the manubrium; body black, paler at apices of the segments; antennæ dirty white; legs and furcula white; antennæ as long as the head. Habitat—Salineville, Ohio . . . *obsolcta*, n. Tibiæ with tenant hairs

27. Mucro with three teeth—the first long, distant from the second, making a distinct vertical hook; the second of the same length as the first, vertical, and in the same line; the third smaller than the second, and not in the same line; furcula attaining the ventral tube; dentes twice the length of the manubrium; superior claw without teeth on the outer margin, and a single tooth on the inner margin; inferior claw greatly dilated at base, dilation squarely interrupted at middle, and with a distinct tooth on the outer angle of the dilation; tibiæ with two tenant hairs; body and antennæ black, paler at the juncture of the segments; legs dirty white, blackish at base; furcula white; antennæ slightly longer than the head; a bristle at the apex; the dentes extends beyond the apex of the mucro. Habitat—Dover, Massachusetts (A. P. Morse). *determinata*, n.

- Mucro with three teeth, the first horizontal, short, the second and third long and slender, vertical, about as long as the first, and as long as the mucro is wide; furcula not attaining the ventral tube; dentes slightly longer than the manubrium; body and antennæ grayish-yellow; legs and furcula white; antennæ slightly longer than the head. Habitat—Salineville, Ohio *inclinata*, n. sp.
28. Inferior claw with a tooth on the inner margin 29.
 Inferior claw without teeth, the inner margin dilated at base; superior claw with a tooth on the outer margin and another on the inner margin; mucro with three teeth, the first and third of about the same length, the first forming a distinct hook, the second half as long again as either the first or third, all vertical; furcula attaining the ventral tube; the dentes more than twice as long as the manubrium; body and antennæ black; legs and furcula brownish-white; antennæ longer than the head, the segments long and slender. Habitat—Ithaca, New York *speciosa*, n. sp.
29. Mucro with four teeth 30.
 Mucro with five teeth, the first tooth short, one-third the length of the second, the second and third subequal, vertical, as long as the mucro is wide, the fourth shorter than the third and cephalad of it, the fifth very small and laterad of the fourth; superior claw with a tooth on the outer and inner margins; inferior claw with a tooth on the inner margin; furcula reaching the second abdominal segment; dentes distinctly longer than the manubrium; ocelli fourteen, seven on each side of the head; body griseo-violaceous; antennæ about as long as the head, the last segment longest, slightly arcuate. Habitat—St. Lawrence Island, Behring Sea **grandiceps*, Reuter.
30. Mucro with the first tooth distinct, prominent 31.
 Mucro with four teeth, the first minute, at the base of the second, the second long, curved, the third and fourth opposite, of the same length as the second; furcula long, reaching the ventral tube; dentes more than twice the length of the manubrium; superior claw with a tooth on the outer margin and another on the inner margin; inferior claw dilated at base and with a tooth on the inner margin; body and antennæ blackish; furcula and legs

* Species not seen.

- white; body, legs, and antennæ, densely hairy; antennæ longer than the head. Habitat—Washington, D. C. (Nathan Banks).....*capitola*, n. s.
31. First tooth of mucro shorter than the second, if as long, subhorizontal.....3
- First tooth of mucro as long as the second, pointing dorso-caudad and as long as the mucro is wide, the third and fourth subequal, opposite, and smaller than the second; the furcula attaining the ventral tube; manubrium elongate; dentes twice as long as the manubrium; superior claw with a tooth on the outer margin and another on the inner margin; inferior claw dilated, with a tooth on the inner margin; body and antennæ black and purplish; legs and furcula brownish; antennæ paler at base, longer than the head. Habitat—Ithaca, New York, and Salineville, Ohio.....*nigra*, n. s.
32. Furcula attaining the ventral tube; dentes twice as long as the manubrium; mucro with four teeth, the first small, subhorizontal and with a distinct hook, the first and third of the same length, the second one-half longer than the third, as long as the mucro is wide, the first, second and third in the same line, vertical, the fourth slightly longer than the third, and pointing slightly caudad; superior claw with a tooth on the outer margin and another on the inner margin; inferior claw dilated at base, with a tooth on the inner margin at middle; antennæ and body black; legs and furcula dirty white; antennæ of the same length as the head. Habitat—Ithaca, New York, and Salineville, Ohio.....*terminata*, n. s.
- Furcula short, not attaining the ventral tube; dentes longer than the manubrium; mucro with four teeth, the first small, not minute, forming a vertical hook at apex, the second and third of the same length, about as long as the mucro is wide, one cephalad, the other of the other, the fourth smaller than the third, and placed lateral of it; superior claw with a tooth on the outer margin and another on the inner margin; inferior claw dilated at base, interrupted at middle, outer angle of dilation with a tooth; body greenish-white, washed with purplish in places; antennæ greenish-white; apices of segments purplish; legs and furcula white; antennæ longer than the head. Habitat—Beverly, Massachusetts (A. P. Morse).....*lateraria*, n. s.

33. Inner margin of inferior claw with a tooth34.
 Inner margin of inferior claw not with a tooth, inferior claw two-thirds the length of the superior claw; superior claw with a tooth on the outer margin and two on the inner margin; mucro with two teeth, the first forming a distinct vertical hook, the first and second subequal in length, about as long as the mucro is wide; furcula reaching to near the ventral tube; manubrium and dentes subequal in length; body greenish-white, the sides and margins of the segments washed with purplish; legs and furcula white; antennæ of the same colour as the body; apices of the segments ringed with purplish, longer than the head. This species will be easily recognized by the great length of the inferior claw; in all the other species examined the inferior claw is not more than half as long as the superior claw. Habitat—Agricultural College, Mississippi (H. E. Weed). *longipenna*, n. sp.
34. Mucro with three teeth, the first long, forming a distinct hook, the second and third of the same length, opposite, and about as long as the mucro is wide; furcula long, attaining the ventral tube; dentes more than twice as long as the manubrium; superior claw with a tooth on the outer margin and two on the inner margin; inferior claw with inner margin somewhat dilated at middle, with a vertical tooth; antennæ not quite twice as long as the head; eye spots black36.
 Mucro with four teeth, the first minute, at the base of the second, the second long, forming a hook, the third and fourth opposite, of the same length as the second, about as long as the mucro is wide; furcula attaining the ventral tube; dentes more than twice as long as the manubrium; superior claw with a tooth on the outer margin and two on the inner margin; inferior claw with a tooth on the dilated inner margin; antennæ longer than the head, purplish at apex; eye spots black; body densely covered with long bristles, one or two on each segment much longer than the others.....35.
35. Body and legs uniformly grayish-white. Common under bark among the droppings of boring beetles. Habitat—Salem, Massachusetts (Packard); Brazos County, Texas (Nathan Banks); Ithaca, New York.....*glauca*, Pack.
 Body white, the segments marked with a broad transverse band of purplish or blue, mottled with paler. Habitat—Franconia, New Hampshire (Mrs. A. Trumbull Slosson). *glauca montana*, n. var.

36. Body yellowish-fuscous, purplish or black without a median black line 37
 Body in great part greenish-yellow with a distinct median black line
 Habitat—Europe; Massachusetts (Packard); White Mountain
 New Hampshire (Mrs. Annie Trumbull Slosson); Long Island
 (Nathan Banks); Virginia (Wm. D. Richardson); Ithaca, New
 York..... *viridis riparia*, Nils.
37. Dorsum, except a few yellowish dots, entirely fuscous. The Massa-
 chusetts specimens of *Isotoma tricolor*, together with *Isotoma*
Belfrageii, *purpurescens* and *plumbea*, belong to *viridis*, Bourlet
 Habitat—Europe; Massachusetts, and Waco, Texas (Packard
 Brazos County, Texas (Nathan Banks); Beverly, Massachusetts
 (A. P. Morse); California (Schott); Ithaca, New
 York..... *viridis*, Bourlet
 Dorsum distinctly marked with yellowish..... 38
38. Yellowish with a distinctly marked wide transverse black band on
 each segment. Habitat—Boreal Europe... **viridis cincta*, Tullb.
 Yellowish, but not with such a band..... 39
39. Each segment marked at middle with a loop-shaped mark, the sides
 of the closed end more distant than those of the open end; the
 open end at the cephalic end of each segment; the closed end
 sometimes interrupted; the sides of the segments prominently
 figured with black. Habitat—Boreal
 Asia..... **viridis arctica*, Schott.
 Each segment marked with three closed and united deltoid-shaped
 marks. Habitat—Agricultural College, Mississippi (H. E.
 Weed)..... *viridis delta*, n. var.
 Species that could not be placed from lack of specimens and of
 figures of the claws and mucrones:—
Isotoma quadrioculata, Tullb.—“*Segmentum tertium abdominis*
brevius quam quartum. in quo furcula inserta est. Ocelli 4; 2 in utroque
latere capitis. Dentes furcule manubris non longiores, recti; mucrones
bidenticulati. Long. 1¼ mm.” Habitat—Boreal Europe and America
 1872. Tullberg, Sveriges Podurider, p. 48.
Isotoma fimetaria, Linn.—“*Segmentum tertium abdominis brevius*
quam quartum, in quo furcula inserta est. Ocelli nulli. Dentes furcule
manubrio fere duplo longiores, recti; mucrones bidenticulati. Long, 1 mm.
 Habitat—Boreal and Central Europe and Boreal America.
 1872. Tullberg, Sveriges Podurider, p. 48.

* Species not seen.